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EVERY MAN A STUDENT.

[Original.]

Some think that nobody is a student, but he who goes to college, and comes out with a degree. There is not a greater mistake in the world. Everybody is a student. About the only difficulty is, they do not know it, or will not believe it if you tell them so. From this two great evils arise:

1. People do not respect themselves sufficiently. While they think themselves good for nothing but to dig and drudge, they are only making themselves in reality good for nothing else. If they will not respect themselves, they cannot in conscience expect that anybody will respect them, and thus they not only fail of having much good influence, but begin to believe they cannot obtain any. If they lavish all their respect on doctors, and other learned men, because they are learned, and at the same time think meanly of themselves, because they are not,—the cure is, not to endeavor to dispossess them of the idea that learning confers an honor on him who possesses it, which is much more true than many of their ideas, but to show them that learning itself is all within their power, and that they, like the others, are students, though in a different course of study.

2. They do not learn half enough. This evil springs from the same origin, and is co-existent with the last mentioned. If people were conscious how much they had already learned, and if they would respect themselves, as beings who have minds, they would so much the readier go on learning. While they admit that it is their duty to do all the good they

can, and to do all as well as they can, strange it is, that they do not perceive how necessary it is to learn as much as they possibly can about this duty.

Who would not call him the most infatuated of men, who should be sent to explore a gold region, and who should expect the mines to break open at his feet, and disclose to him, without toil, their richest deposits. And how is he less foolish, who is sent to explore a world of duty, and who thinks he can perform the work of a good and faithful servant, without making a word of inquiry, as to where the treasures are which he is to dig up, or without analysing a single fragment of the rocks around him, to see whether they contain precious ore?

We have said that people do not know half enough. There is no need of proving this. The proofs have been heaping up before everybody's eyes, for a long while. Why, we have been told that many masons, builders, &c., do not know how to measure their own work, after they have done it; and thus they are exposed to the double disadvantage of being obliged to pay somebody for doing it for them, and of being liable to be imposed upon into the bargain. And were it worth the time, there is no doubt but we could find dozens of other cases of a like nature.

We say, then, that everybody, mechanic, farmer, lawyer or doctor, no matter which—must be a student. And we are not sure but the mechanic and farmer—and the merchant, too—need to study just as much as the doctor.

Probably they will not have to study as hard, but whether they will become, in the end, any more perfectly acquainted with their business, is a more difficult question. One thing is certain—the more they study, the more they will see is necessary to be learned.

There is no danger, now-a-days, of being burned for witchcraft. The days are over, when a poor blacksmith, who, being unable to write, charged his customers by marking the figures of the articles he had made for them in his books, was condemned as a magician. Now, every one, though he be but a poor blacksmith, who does not know how to read and write, passably, at least, is considered almost beneath his profession. Are not the days coming, when every blacksmith who does not understand chemistry, will be considered unworthy of his profession? If it is not to be so, not only in this but in every trade, how and when are they, whose duty consists in those mechanical employments which are necessary for the support and comfort of civilized life, to perform that duty in the best manner, as they ought to do?

MAHOGANY.

[From the Book of Commerce.]

The common mahogany is one of the most majestic trees in the world. In Cuba and Honduras, this tree, during a growth of two centuries, expands to such a gigantic size, throws out such massive arms, and spreads the shade of its shining green leaves over such a vast surface, that even the proudest oaks of our forest appear insignificant in comparison with it. A single log has often weighed six or seven tons, and been sold for more than one thousand dollars.

The discovery of this beautiful timber was accidental, and its introduction into notice was slow. A physician of the name of Gibbons, who resided in London, received, in 1724, a present of some mahogany planks from his brother, a West India captain. The doctor was erecting a house, and gave the planks to the workmen, who rejected them as being too hard. The doctor's cabinet-maker was employed to make a candlebox of it; and as he was sawing up the plank, he also complained of the hardness of the timber. But when the candle box was finished, it outshone in beauty all the doctor's other furniture, and became an object of curiosity and exhibition. The wood was then taken into favor; and the despised mahogany became a prominent article of luxury among the rich.

The mahogany tree is found in great quantities on the low and woody lands, and even upon the rocks in the countries on the western shores of the Caribbean sea, about Honduras and Campeachy. It is also abundant in the islands of Cuba and Hayti, and it used to be plentiful in Jamaica, where it was of excellent quality; but most of the larger trees have been cut down.

The season for cutting the mahogany in Honduras usually commences about the month of August. The gangs of laborers employed in this work consist of from twenty to fifty each, few exceeding the latter number. They are composed of slaves and free persons, and each gang has one person belonging to it termed the huntsman. His chief occupation is to search the woods, or, as it is called, the bush, to find labor for the whole.

Accordingly, about the beginning of August, the huntsman is despatched on his important mission. He cuts his way through the thickest of the woods to some elevated situation, and climbs the tallest tree he finds, from which he minutely

surveys the surrounding country. At this season the leaves of the mahogany tree are invariably of a yellow reddish hue, and an eye accustomed to this kind of exercise can, at a great distance, discern the places where the wood is most abundant.

He now descends, and directs his steps to the spot which he may have selected. Having reached it with his party, the next operation is the felling of a sufficient number of trees to employ the gang during the season. The mahogany tree is commonly cut about ten or twelve feet from the ground, a stage being erected for the axe-man employed in levelling it. The trunk of the tree, from the dimensions of the wood, is generally preferred; but for ornamental purposes, the limbs or branches are preferable.

A sufficient number of trees being felled to occupy the gang during the season, they commence cutting the roads upon which they are to be transported. This may fairly be estimated at two thirds of the labor and expense of mahogany cutting. Each mahogany work forms in itself a small village on the banks of a river; and the nearer the trees grow to the river, the less difficulty there is in their transportation.

If the mahogany trees are much dispersed or scattered, the labor and extent of road-cutting are of course greatly increased. It not unfrequently occurs that miles of road and many bridges are made to a single tree, that may ultimately yield but one log. When roads are cleared of brush-wood, they still require the labor of hoes, pickaxes and sledge-hammers, to level down the hillocks, to break the rocks, and to cut such of the remaining stumps as might impede the wheels that are hereafter to pass over them.

The roads being now in a state of readiness, which may generally be effected by the month of December, the mahogany tree is cut into logs, which are squared by means of the axe. In March, the season being dry, it is time to draw down the logs from their place of growth. A gang of forty men is generally capable of working six trucks. Each truck requires seven pair of oxen and two drivers; sixteen to cut food for the cattle, and twelve to load or put the logs on the carriages.

From the intense heat of the sun, the cattle, especially, would be unable to work during its influence; and, consequently, the loading and carriage of the timber are performed in the night. Pieces of wood split from the trunk of the pitch pine are used as torches by the workmen. The river-side is generally reached by the wearied drivers and cattle

before the sun is at his highest power; and the logs, marked with the owners' initials, are thrown into the river.

About the end of May the periodical rains again commence. The torrents of water discharged from the clouds are so great as to render the roads impassable in the course of a few hours, when all trucking ceases. About the middle of June, the rivers are swollen to an immense height. The logs then float down a distance of two hundred miles, being followed by the gang in canoes, to disengage them from the branches of the overhanging trees, until they are stopped in some convenient situation at the mouth of the river. Each gang then separates its own cuttings, which are recognized by the marks on the ends of the logs, and forms them into large rafts. In this state they are brought down to the wharves of the proprietors, where they are taken out of the water, and smoothed on their sides by the axe. The ends, which frequently get split and rent by being dashed against rocks in the river, are also sawed off. They are now ready for shipping. Belize is the principal port for this purpose.

TRANSPORT OF HEAVY BURTHENS UPON ICE.

THE following is an abstract of some observations made by Prof. Thomas Jefferson Cram, of the United States Military Academy, and communicated to the Journal of the Franklin Institute.

FOR ordnance purposes, it became necessary, on the 13th of January, 1835, to transport a heavy piece of artillery, (an iron 24 pounder,) across the Hudson, from West Point to Cold Spring Foundry. To ensure safety, two ox sleds were connected, one after the other, and upon which two timbers were longitudinally placed and secured; between these timbers, the gun, previously dismounted from its carriage, was swung, by resting its trunnions upon them, at such points that the whole pressure was distributed, as uniformly as possible, upon the ice which sustained it. A pair of horses were attached to another sled, which was connected with the foremost of those before named, by a rope about thirty feet in length.

The ice over which the gun was taken, had been chiefly formed during that intensely cold week, (in January, 1835,) when the mercury in Fahrenheit's thermometer ranged, here, between $-2\frac{1}{2}$ and $-15°$. The effects of the pressure upon the

ice were carefully observed, by myself, along the entire route, and were such as to induce the belief that an idea of its strength could be formed with sufficient certainty to be of practical utility, in all cases where the safety of transporting any load upon ice might be jeoparded.

The ice was drilled through, and its thickness measured, to a tenth of an inch, at intervals of two hundred paces and less, along the whole extent of the track. From the place of departure, to the channel of the river, the thickness diminished from 16·5 in. down to 8 in., and no signs of cracking or bending were observed in the ice—the horses going at the rate of about four miles an hour. Across the channel, the thickness increased from eight inches to twelve inches, and no evidence of breaking or bending was exhibited,—the load moving with a speed of about eight miles an hour. From the west edge of Cold Spring flats, to the vicinity of the entrance of a creek, the thickness varied from 12 in. up to 15·5 in., and no indications of yielding were perceived, the horses going at a gentle trot. Near the entrance of the creek, for an extent of fifty paces, the average thickness of the ice was only 5·56 in., and it was covered with a sheet of snow water, two inches in depth. This fifty paces of ice was observed to bend so much under the gun, that I was very apprehensive of its breaking; indeed, had the load been stopped for a few seconds only, it undoubtedly would have gone to the bottom. The depression along here was at least two inches, and the flexure of the ice under the foremost of the sleds, bearing the gun, was less than that under the hindmost, owing to its being weakened by the former, ere the latter came upon it. On crossing this weak spot, the horses had become so much fatigued, and the resistance increasing, by being drawn up the inclined surface of the bending ice, that, with much whipping and shouting, they were barely urged to drag the gun safely over, at a velocity of about four miles an hour.

To determine the pressure sustained by a given superficies of the ice under consideration, it is to be remarked, 1st, That, from the dimensions of the bottom surfaces of the four sled runners under the gun, the whole surface of ice in contact with these bottom surfaces, at the same time, was 6458 square feet. 2. That the weight of the gun is marked 5579 lbs., and the sleds supporting it, together with the timbers, lashing chains, wedges, blocks, &c., weighed, in all, 1624 lbs., one sled weighing as much as the other. 3d. That the horses and their sled were so far in advance, the pressure arising

from this cause may be neglected, inasmuch as it did not act at the same time, and upon the same ice, with that arising from the gun.

Therefore, the whole pressure sustained by the 6458 square feet of ice, at the same time, was equal to 5579 + 1624 lbs., or equal to 7203 lbs.; and admitting, what was very nearly the truth, that the pressure was distributed uniformly, and dividing 7203 by 6·458, we shall have, 1115·361 lbs., for the pressure sustained by each square foot; at all events, 1115·361 lbs. will be the *average* pressure sustained by a square foot of the ice.

From the observed effects upon the fifty paces of ice at the entrance of the creek, one can form a pretty accurate estimate of the *least* thickness upon which we can *safely* bring a pressure (of 1115·361 + 10) equal to 1125·361 lbs., (the ten additional pounds being the allowance for the covering sheet of water.) It is evident that the ice will *not be safe*, if its thickness be not above 5·56 in.

From the foregoing facts, which were obtained with the greatest care, it may be inferred, 1st. That a load may be transported with perfect safety over sound ice, eight inches in thickness, by distributing the entire weight of the system, so that each square foot (in contact with the bottom surfaces of the runners) shall experience a pressure of not more than about 1115 lbs. 2d. That a load *cannot be safely* transported over sound ice, 5·56 in. thick, when the weight is so distributed, that each square foot of surface (in contact with the bottoms of the runners) shall experience a pressure so great as about 1125 lbs.

CURIOUS EFFECT OF HEATED METAL ON WATER.

[From the Mechanics' Assistant.]

When water is heated in an open vessel, to the temperature of 212° F. it boils, and is completely evaporated if it be pure, without any alteration occurring in the temperature. But it may be heated to a much greater degree, if pressure be exerted upon its vapor, in a close vessel.

It would seem that water should evaporate faster, the hotter the vessel that contains it. However, experiment proves the reverse; if the vessel which contains water, be heated to a red or white heat, evaporation ceases. Every person has seen drops of water projected on a red hot iron

plate, suddenly assume a spherical form, and roll about much longer than would be necessary for their complete volatilization under these circumstances. Several observers have attempted to explain the phenomenon. Mr. Pouillet has examined it recently, and he has shown that by dropping water into a platina crucible, heated to bright redness, it could be half filled, and be kept in this state for some time, without sensible evaporation occurring. At times the water appears calm, at times it is animated by a gyratory movement, but it never disengages any visible vapor. If the crucible be removed from the fire, and allowed to cool, as soon as it cools to dull redness, the water enters into a violent ebullition, and is completely transformed into vapor.

This phenomenon is difficult to explain, and is attributed by different philosophers to different causes. We shall not enter into a detail of them here, as theory is not the object of this work; but although we may be unable to ascertain correctly, the cause of this circumstance, we must admit the truth of the fact. It ought to warn us of the danger which a steam-boiler accidentally raised to a high temperature would occasion; for it is probable that steam might not be furnished, and that nevertheless a depression of temperature would determine its explosion. Plates of fusible metal are the only possible securities against this species of explosion, because they limit the degree of heat which the apparatus can acquire; for it is evident, that a safety valve will not be raised at the time this singular phenomenon is manifested.

THE NUTMEG.

The true Nutmeg, as well as the clove, is a native of the Moluccas or Spice Islands, but principally confined to the group, called the Islands of Banda, under the equator, where it bears blossoms and fruit at all seasons of the year. In their native country, the trees are almost always loaded with blossoms and fruit; and the latter is gathered at three different periods of the year; viz., in July, November and April. In April, both the nutmeg and the mace are in the greatest perfection, the season then being the driest. The outer pulpy coat is removed, and afterwards the mace; which, when fresh, is of a crimson color, and covers the whole nut. The nuts are then placed over a slow fire, when the dark

shell next the mace, and which coats the seed, becomes brittle; and the seeds or nutmegs of commerce, drop out. They are then soaked in sea-water, and impregnated with lime—a process which answers the double purpose of securing the fruit from the attacks of insects, and of destroying the vegetating property. It also prevents the volatility of the aroma or fragrance. The mace is simply dried in the sun, and then sprinkled with salt water, when it is fit for exportation.

AMERICAN PATENTS.

[Abridged from the Journal of the Franklin Institute.]

PATENT *for a Composition to Prevent the Absorption of Oils by Wood;* Nathaniel Hathaway, Fairhaven, Bristol county, Massachusetts, May 22.

The patentee claims 'the application of glue to prevent the absorption of animal and fish oil by wood, whether used alone or combined with the other ingredients aforenamed, and whether those ingredients are used in the proportions set forth, or in other and different proportions.' Glue has been used between the staves of oil casks, to prevent the leakage which otherwise takes place, and a few years ago this application was made the subject of a patent. The effect of glue in this particular is so familiarly known, that, had any one inquired of us how to prevent the absorption of oil by wood, we should have said, 'saturate it with glue,' and that without supposing that we were telling a secret.

The composition referred to by the patentee is two pounds of glue, dissolved, one quarter of a pound of *whale foots*, one quarter of a pound of bright varnish, and one quarter of a pound of rosin, melted together, and combined by stirring, adding thereto a sufficient quantity of water to give it a proper consistence.

PATENT *for a Lamp for Burning Volatile Materials;* George Eyles, Boston, Massachusetts; an alien, who has resided two years in the United States, May 22.

The construction of this lamp is very much like that of the blow pipe by alcohol; but it is not, like it, furnished with a reservoir and wick below the recipient of the spirit; but the jet through which the vapor is to issue is carried down below the body of the recipient, and thus supplies the requisite heat.

PATENT *for an improvement in the Mode of Heating and Applying Heated Air to Blast Furnaces;* Isaac Tyler, Jr., Baltimore, April 18, 1834.

It is a well established fact that great advantage is derived from heating the air which is to be applied to furnaces for smelting, and other operations of metallurgy requiring high degrees of heat; and my invention or discovery consists in a mode of taking advantage of this principle in a new way, which will admit of the employment of anthracite coal so as to supply a large portion of the heat required, and a consequent and great diminution of the proportionate quantity of the charcoal or coke usually employed.

I construct a cylinder of cast or wrought iron, of such dimensions as must be determined by the size of the furnace to be supplied, and the degree of temperature to which it is determined to heat the air. This cylinder I place vertically, and make one opening in the side thereof for the admission of air from the blowing apparatus, and another for the conveyance of the heated air into the furnace; placing them in such positions as shall cause the heated air, in its passage from one to the other, to be subjected to the heating influence of the ignited fuel which is contained within the cylinder.

The cylinder I line with fire brick or some other non-conductor of heat, suitable for the purpose, and within it I place a grate to contain the ignited fuel which is to heat the air. This grate may extend across the entire cylinder, so as to support the fuel; it may be situated at any convenient part of it between the pipes for the ingress and egress of the air. Proper openings must, of course, be made in the cylinder for the supply of fuel, which may be contained in a reservoir, so as to be heated before it is introduced; the modes of effecting this are known to those conversant with furnaces.

Sometimes I intend to enclose a second cylinder within the former, which second cylinder is to contain the fuel, leaving a space between the two for the circulation of air. This second cylinder is to be open at top for the introduction of the fuel, the space between it and the outer one being permanently closed; it may reach down to the bottom of the entire cylinder, or nearly so. The upper part of it, say for half its length, more or less, may be made without openings, whilst the lower part is to be formed into bars, or otherwise perforated in the manner of a grate. When filled with fuel, an air-tight cover is placed upon it, being made close by luting or otherwise. The upper part of this cylinder serves as a reservoir for fuel; and to adapt it to this purpose more fully, it may be extended to any convenient height above the outer cylinder.

Instead of allowing the pipe through which the blast is introduced to terminate at the inner surface of the outer cylinder, I intend sometimes to conduct it across the space between the two, and into the inner cylinder within which the fuel is contained; governing myself in this and other points by the degree to which I may find it desirable to heat the air.

PATENT *for an improvement in Machinery for the Throwing or Twisting of Silk;* Lucilius H. Mosely, Poughkeepsie, Dutchess county, New York, May 9, 1835.

The ordinary method and machinery in use, (for which the one invented by me is intended to be a substitute,) consists of two rollers, one resting upon the other, and weighted down by means of a spring or dead weight, in order to prevent the thread from passing through faster than the natural delivery of the rollers; the threads being governed through the rollers, and down to the spindle, by means of guide wires on each side of the rollers. My improvement or invention, is this—that in lieu of the two rollers and guide wires, a single grooved roller is used for each thread, with a band of leather around and affixed to its larger surface, its smaller surface being a polished groove, on which to secure the thread, and pass it to the spindle, the thread being passed over and around the groove. This grooved roller is turned (thereby delivering the thread to the spindle or spool,) by a second roller, on which it rests, the leather surface touching and resting upon this second roller, and is carried round by it, by reason of the mere weight of the grooved roller. This grooved roller revolves around a screw-pin or pivot, passing through its centre, and affixed to an arm, the other end of which arm is attached by a like pin or pivot, to a part of the twisting frame, (or to a stand which is attached to the twisting frame,) in such a manner that the end upon which the grooved roller is placed, may (together with the roller) be raised from the second roller, when necessary, either for attaching or detaching the thread. This grooved roller may be made of different metals, or of other materials.

The benefit of this improvement and invention is, that it dispenses with the guide wires, is more simple, easier to tend, does not mangle, cut or waste the thread, and is more rapid in its operation than the method now in use.

SUBSTITUTE FOR INDIGO.

A COMPANY has been formed in England, for the manufacture of a substitute for Indigo, which is said to be a much cheaper article, as well as a much superior dye, in all cases where indigo is now employed. We extract from the New York Mechanics' Magazine, some account of the invention, consisting of paragraphs from the Company's prospectus.

THE objects of the Company are to encourage the manufacture, and to bring into general use, the British Substitute or Foreign Indigo; and to dye wool, stuffs, cloths, silks and other fabrics, blue or other colors, (for which indigo is now used,) with this substitute, in the preparation of which a new and wide field will be opened to the industry of this country.

By the use of the substitute, a considerable saving will accrue to the manufacturer, and the colors produced, such as blues, blacks, greens, bronzes, browns and various others, will be so fast as to resist the action of light, air and friction. The articles so dyed will not turn white at the edges or seams, a quality long sought after, particularly in stuffs or cloths for furnitures and other purposes, in which exposure to light and heat is inevitable, and hitherto has proved destructive of their colors.

Independently of fastness, a brilliancy of color will be produced by the substitute, which cannot be attained with indigo. For more than half a century the first chemists of Europe have directed their best energies to the discovery of some means by which a perfect and uniform blue dye (other than indigo) might be obtained. Hitherto their researches have been unsuccessful; insurmountable objections presenting themselves in the caustic qualities of Prussian blue (the only known substitute) in some processes hardening the wool when dyed and rendering it difficult to work, and in others destroying its fibre. At length a process has been discovered for which a patent has been obtained, effectually neutralizing the objectionable properties of the component parts of Prussian blue. A patent has also been obtained for the manufacture of the prussiates of potash and soda, rendering them fit for many purposes to which hitherto they have been inapplicable, while they are in every respect, in conjunction with certain ingredients, a perfect substitute for indigo as a dye for wool, &c. Facts which have borne the test of extensive experiment, demonstrate this substitute in all respects to be equal, and in many superior to, and far exceeding in brilliancy and durability, any dye obtained by the use of indigo.

The materials of which the substitute for indigo is composed, are in great abundance both in England and Ireland, but at present they are in most instances wasted. The articles alluded to are blood, horns and hoofs of animals, bones, fish, cuttings of leather, old harness, and all other kinds of animal substance, old woollens, the refuse of woollen manufactures, old garments, &c. The articles combined with the animal substances in the preparation of the new dye, are potash or soda, acid and iron.

PAPER MACHINES.

[From the Mechanics' Assistant.]

The machine in general use for making paper was introduced by Messrs. Fourdrinier. It was first suggested by Mr. Didot, but his plans were too crude for practice, and the machine received its perfection from Mr. Donkin. It consists of an endless web of wove wire, about thirty feet long in the web or 'wire,' as it is called, and joined together after the manner of a jack-towel; the endless wire runs over a number of rollers, placed horizontally, so as to present a level surface about fifteen feet long. As the wire moves, a quantity of pulp is allowed to flow upon it from a chest or vat, at one end of the wire; this chest is furnished with a broad and level spout extending across the wire; the spout has an apron or slip of leather nailed to it, so that the leather apron lies upon the wire and prevents the pulp from running off, while the flexibility of the leather allows the wire to move under it without injury. A shaking or jogging motion is given to one end of the wire to produce the settling of the floating fibres, and the water continues to drain from the pulp till it reaches the further end of the wire; here the water is more completely pressed out by rollers. The web of paper may then be considered in form; it is, however, too weak to support its own weight, and is passed over an endless cloth, in order to expose it to the air, to soak out still more moisture, and to make the texture firmer by passing it between other pressing rollers; it is then passed over large cylinders filled with steam, which effectually dries it, and the web of paper is finally wound round a reel, which will thus sometimes contain a single sheet of paper three fourths of a mile long.

Beautiful and striking as this machine is, it is yet exceeded by the machine invented by Mr. Dickinson. Instead of the endless web of wire thirty feet in length, he employs a perforated brass cylinder, about twenty inches in diameter, covered with the woven wire. The cylinder revolves in a vat of pulp, in which it is so far immersed as to leave about one foot of the surface of the cylinder above the surface of the pulp. As the cylinder revolves, the water flows through the wire into the interior of the cylinder, whence it is abstracted by a syphon passing through its hollow axis, and the pulp continues to accumulate upon the whole immersed surface of the cylinder. At that part of the cylinder which is not immersed in the pulp, the action of an air pump is most ingeniously applied; a pipe from an air pump is introduced through the hollow axis of the cylinder, and terminates in a pan or trough fitted close by 'parking' to the unimmersed part of the cylinder. This air trough maintains its position while the cylinder revolves over it, and the instant the unformed paper comes over the air trough, the water passes through and the paper is set; it is subsequently passed between pressing rollers, and dried by steam, and reeled up as already described.

It has now to be cut into sheets for use. In the ordinary way this is done by cutting through the reel or coil of paper in the direction of its axis; then laying it flat on the table, a block of wood of the required size is pressed down upon the paper, and a cutting-plough carried round the edge of the block. This method occasions a great loss of shavings, as it is obvious that the outside of the coil must be larger in circumference than the inside. This loss is now obviated by a machine invented by Mr. Cowper; in this machine the web of paper is cut longitudinally by circular knives, and in a traverse direction by a serrated knife, resembling a row of penknife points.

Notwithstanding all the care to keep little knots and straws out of the pulp, some will escape, and consequently every sheet has to pass through the hands of women, who, with a sharp knife, scratch out any lumps they find; but even this defect seems likely to be removed by the recent invention of Mr. Ibbotson, who has devised a strainer of peculiar construction, and which is found to answer. It consists of two brass plates cut into very long angular teeth, extending across the box or sieve of which they form the bottom. When the plates are put together, the teeth of one plate fill and completely close the spaces of the other; on withdrawing

them, a little series of long narrow openings or slits are formed. Now it is found that the fibres of pulp will flow through small square holes, while the knots are as effectually stopped by the slit as they would be by square holes.

ARTIFICIAL STONE.

THE December number of the New York Mechanics' Magazine, contains an article upon the American Cement or Artificial Stone, invented by Mr. Obadiah Parker, of which a slight notice was sometime since given in the Mechanic. A number of certificates are given, in testimony of the efficacy of the material for cisterns, &c., and other purposes where a water-proof material is required. The following extract will be found interesting:

LAST spring a company was formed, and suitable accommodations provided in Amos street, where specimens of various kinds might be prepared for exhibition; and where experiments might be carried on for the purpose of ascertaining the various purposes to which the cement might be usefully applied—and that they might be at the same time prepared to execute such orders as might be given for cisterns and other purposes. They commenced by putting down several cisterns, vats, cellar-steps, specimens of aqueducts and sewers—and also by erecting a pillar, cisterns and vats above ground, together with numerous other specimens of curbs, arches and necks of cisterns, &c.—which soon attracted attention, and gave the Company more orders than they could execute.

In order to satisfy the community still farther, if it were necessary to do so, they commenced and completed an office for their own use, on the front of their lot in Amos street, which is a beautiful specimen of work. It is a small building about 16 by 12 feet on the ground, and 12 feet high, having four beautiful columns and pediment, with a door and two windows in front, an arched roof entirely of cement, and sky light in the top—thus forming an entire building, including floor, walls and roof, of one solid piece, and of imperishable material; alike proof against fire and water. The only wood to be seen in the structure is in the door, windows and casings of them.

There is indeed something singular in this material, and in its rapid transition from a paste to a solid rock. It may, when properly prepared, be poured from a vessel, a pail for

instance, into a mould, as you would pour thin porridge; and it will in a few hours become set or hard, so that the mould may be taken from it, and the article moved from place to place, without injury; yet it may be cut with a knife as readily as cheese, for a short time, although it becomes harder and harder until it is equal to freestone, marble and even granite, and finally, until fire may be struck from it with a steel as from a flint, while it rings sharp and clear on being struck, like porphyry.

It is also capable of resisting intense heat—an important quality which is not possessed by some of our most valuable and fashionable kinds of stone, now much in use in this country; and it must therefore be extensively introduced for various purposes of building. It is also valuable for side-walks, for which use it is found to answer a good purpose; also for drains and sewers—for the latter of which purposes a beautiful specimen of about 2½ feet diameter has been laid down in Vesey street, from the Astor Hotel to the North River, for the purpose of carrying off the wash of that immense establishment; and if it had been necessary, it might doubtless have been made six feet, as well as 30 inches in diameter, with perfect safety. Indeed, we see no good reason why an aqueduct might not be made of this material, under ground, for the purpose of introducing water into this city; and in order always to be sure of a constant supply, there might be two of them side by side, of four to six feet internal diameter, each with a thickness of material of 1½ to 3 feet.

These, however, are only a few of the numerous uses to which it may be, or in fact is already appropriated. Beautiful specimens of busts or statuary have been already made; and it will come into extensive use for coffins and cemeteries. We have seen specimens of coffins which received a beautiful polish, or any kind of stain or painting, and gilding, that may be desired, with a glass over the face. A coffin made of this material will be of about the same weight as one of similar size made of solid white oak.

EASY METHOD OF DIVIDING A COGGED WHEEL.—Set the compasses at a required pitch, suppose ½ an inch, strike out seven times the pitch (3½ inches) in a straight line, which 7 subdivide into 11. Each subdivision is equal to 4 cogs; so that if a wheel of 27 cogs is wanted, 6 subdivisions and ¾ of another will give the radius of the wheel.

PAVING WITH SHELLS.

The city of Mobile is paved with shells. In a Virginia paper there is a curious article on 'the former unhealthiness of that city, and the beneficial change caused by paving the streets with shells.' The shells that are used are cockle, or sea muscle, as some call them. They are of the size of a half dollar to that of a dollar, of the form of a clam shell, and they are pretty thick and solid. They abound about the shores of the bay, and are contained in large banks upon the marsh islands opposite and above the city; perhaps having been the *nuclei* upon which those islands were formed. The shells are brought to the city in large lighters. When the street is graduated after the manner of turnpiking, the shells are carted over the street to the depth of four or five inches. The spreading hardly forms a moment's obstruction to the passage along the street. As soon as they are spread, which is done by scattering them with a spade, carriages and horses pass over them, and they very soon form a crust so well cemented as to be difficult to dig up with a pick-axe. They wear out by very constant use on the most frequented streets, but by very little attention to *breaks* and thin places, when a street is once shelled, it is very easily kept in repair.

NOTES FOR FEBRUARY.

Extraordinary Effect of Age upon Compositions of Metal.—In the course of ages, says a writer in the Journal of Science, the copper alloy of an old silver coin had removed from the most internal parts of the coin, and become crystallized on its surface, showing that a slow movement may take place in substances of the densest textures. The proportion of copper in the coin, was originally one ninth; that which remained did not exceed one seventeenth. The copper which had escaped was encrusted on the surface, in the form of purple and green Neapolitan patina; and as hard, or harder than the metal itself.

Bakers among the Romans.—They were so much esteemed that they were occasionally admitted into the senate. They were associated as a corporation, from which neither themselves nor their descendants

were allowed to withdraw. They were exempted from guardianships, to which the other citizens were liable, in order that they might not be interrupted in their business. Each baker was under the supervision of a patron; and one of these generally managed the concerns of all the others.

Recipe for Turners.—To prepare two pieces of wood, which it is necessary to glue together in working them, so that they may be afterwards easily unglued:—After covering with glue the faces of the pieces of wood to be joined, place a piece of brown paper, rather stout, between the pieces, and thus put them together. When the pieces are turned, pass the blade of a knife, or a piece of sheet tin, through the joining, and the paper will split, so that the pieces can be separated without difficulty. This may be found useful and convenient to cabinet makers and turners, if they have not already practised it.—Manuel du Tourner.

Permanent Dye for Wool.—The decoction of the leaves, stalks and closed flowers of agrimony, (a common plant,) says the Mechanics' Messenger, impregnated with a dilute solution of bismuth,* imparts a beautiful and permanent gold color to wool. The flowers of the same plant are also said to be employed by tanners, for curing soft and delicate skins.

The Last Resort.—The last plan we have seen for steering balloons, is, to attach to them a sufficient number of strong birds, as eagles, who will draw it through the air. The proposer supports the principle that no machine can be obtained, of sufficient power to overcome the resistance which itself and the balloon together would oppose to a current of air—a principle which we have always feared would present too great an obstacle to air-navigation.

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* It would be important to know in what the bismuth is dissolved.

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